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EXAMINER

MARTIN, ANGELA J

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CURTIS A. RICHARDSON and
MICHAEL J. YAX

Appeal 2008-2796
Application 10/606850
Technology Center 1700

Decided: June 18, 2008

Before EDWARD C. KIMLIN, ROMULO H. DELMENDO and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 11-29. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).
We AFFIRM.

INTRODUCTION

Appellants claim a fuel cell assembly comprising, in relevant part, a gas spring 10 disposed within the assembly between the stack and supporting structure, said spring including a first membrane 20, a second

membrane 22, means for sealing edges of said first and second membranes to define a closed chamber therebetween for capture of gas 24, first valve means for admitting gas to said chamber 30, and second valve means for exhausting gas from said chamber (Claim 11, Figure 2). The gas spring is disclosed as providing a compressive load to a fuel cell assembly at ambient and elevated temperatures to compensate for mismatches in the heights of multiple stacks and for the difference in thermal expansion between the stacks and the supporting structure (Spec. 3).

Claim 11 is illustrative:

11. A fuel cell assembly, comprising:
a) at least one fuel cell stack;
b) a supporting structure surrounding said fuel cell stack; and
c) a gas spring disposed within said assembly between said stack and said supporting structure, said spring including a first membrane, a second membrane, means for sealing edges of said first and second membranes to define a closed chamber therebetween for capture of gas, first valve means for admitting gas to said chamber, and second valve means for exhausting gas from said chamber.

The Examiner relies on the following prior art references as evidence of unpatentability:

Kenchington	6,626,650 B1	Sep. 30, 2003 (Dec. 7, 2001)
Simpkins	2003/0235723 A1	Dec. 25, 2003 (Mar. 13, 2003)

The rejection as presented by the Examiner is as follows:

1. Claims 11-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Simpkins in view of Kenchington.

The Examiner finds that Simpkins discloses all of the features of claim 11, except for the first valve means and the second valve means (Ans.

3). The Examiner finds that Kenchington discloses the first and second valve means for fluid displacement, which may be used in a fuel cell system and a gas spring (Ans. 3).¹ The Examiner concludes that it would have been obvious at the time the invention was made to combine Kenchington's valves with Simpkins gas spring because "Kenchington . . . teach that the first and second valve means allow gas to be expelled only when a pressure differential is established, which would prevent a portion of gas from leaking in an opposite direction from the flow of gas" (Ans. 4).

Appellants argue independent claims 11, 13, and 21. However, Appellants' arguments regarding claims 13 and 21 do not amount to separate arguments because Appellants' make the same arguments with regard to claims 13 and 21 as are made regarding claim 11. Accordingly, we focus on claim 11 in addressing Appellants' arguments regarding the § 103 rejection.

OPINION

Appellants argue that Kenchington is non-analogous art (Br. 8). Specifically, Appellants contend that there is no evidence of record to suggest that Kenchington's valves (16, 116) could be used for a fuel cell assembly such as shown in Simpkins (i.e., the references are in different fields of endeavor) (Br. 8). Appellants contend that Kenchington's displacement machine would be used in lieu of a fuel cell assembly such that Kenchington teaches away from using the valves in a fuel cell assembly (Br. 9). Appellants contend that the problem addressed by Kenchington's valves

¹ Appellants indicate and the Examiner agrees that the "first valve means" and "second valve means" are not in means-plus-function format and thus do not invoke 35 U.S.C. § 112, 6th paragraph (Br. 5; Ans. 4).

is not reasonably pertinent to the problem Appellants are trying to solve (Br. 9). Appellants contend that the problem addressed by their claimed invention is maintaining a compressive load on a fuel cell assembly within a predetermined pressure range at ambient and elevated temperatures (Br. 9). In contrast, Appellants contend, Kenchington's valves are directed to the problem of maintaining a constant pressure within a given chamber upon a change in volume (Br. 10). Appellants contend that there is no motivation for the combination because of the different purpose of the valves (Br. 10).

Appellants further argue that there is no motivation for combining Kenchington's valves with Simpkins' gas spring because the Examiner refers to separate embodiments in Kenchington for the teaching of the valves (i.e., to valve 16 in Kenchington's first embodiment as the first valve means and valve 116 in Kenchington's compressor embodiment as the second valve means) and Kenchington does not disclose putting those valves from the separate embodiments together (Br. 11).

We have considered Appellants' arguments and are unpersuaded for the reasons below.

When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740 (2007). "[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *Id.* Any need or problem known in the field of endeavor at the time of invention and addressed by the prior art

can provide a reason for combining the elements in the manner claimed.
KSR, 127 S. Ct. at 1742.

Simpkins discloses a gas spring in which the pressure increases with temperature according to Boyle's Law² (Simpkins, ¶ [0016]). Simpkins discloses that air is added to the gas spring in a known fashion at any desired temperature (Simpkins, ¶ [0033]).

Kenchington discloses a cyclically operable fluid displacement machine (Kenchington, col. 1, ll. 4 and 5). Kenchington discloses a compressor embodiment having a one-way valve 106 that permits gas to flow via inlet 107 into a chamber 104, but not out of the chamber 104 into the inlet 107 (Kenchington, col. 12, ll. 30-33). Kenchington further discloses that the one-way valve 106 permits air ingress when a preset pressure limit is reached (Kenchington, col. 12, ll. 33-37). Kenchington further discloses a third one-way valve 116 which allows gas to be expelled from a chamber 105 to an outlet 117 but does not allow gas to be drawn into the chamber 105 from the outlet 117 (Kenchington, col. 13, ll. 6-11). Kenchington further discloses that air is expelled through valve 116 only when a preset pressure differential is met or surpassed (Kenchington, col. 13, ll. 11-14).

We are unpersuaded by Appellants' mere argument that Kenchington and Simpkins are not in the same field of endeavor because this is not dispositive to the question of whether a person having ordinary skill in the art would have combined the elements in the manner claimed. Even if these references are from different fields of endeavor, Appellants have failed to

² Boyle's Law states that in a closed system approaching ideal gas environments, pressure (P) and volume (V) are inversely proportional at a fixed temperature.

demonstrate that Kenchington's valves would *not* reasonably be expected to improve the Simpkins device by facilitating Simpkins' purpose of adding air to the gas spring in a known fashion. *KSR*, 127 S. Ct. at 1740.

Based on the above disclosures, we determine that Kenchington's invention controls pressure in a chamber using check valves. We determine that Kenchington is analogous art because it addresses a problem relevant to Simpkins' disclosed invention, which need not be the same problem addressed by Appellants' claimed invention. *KSR*, 127 S. Ct at 1742. Specifically, Kenchington discloses using check valves for release or addition of air to a closed chamber in response to predetermined pressures. Accordingly, one of ordinary skill in the art presented with Simpkins' sealed gas spring susceptible to overpressurization would have looked to Kenchington's valves (i.e., check valves) to prevent the gas spring from being overpressurized due to temperature and/or volume changes by permitting the ingress or egress of gas at predetermined pressures.

We add that even under the stricter "reasonably pertinent to the particular problem with which the inventor was concerned" analogous art test, *In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992), Kenchington is analogous art. Appellants indicate that the problem they seek to solve is maintaining a compressive load to a fuel cell assembly within a predetermined pressure range at ambient and elevated temperatures. Appellants' Specification indicates that the change in pressure in the gas spring follows Boyle's Law and that the membranes are urged apart axially by increasing pressure (i.e., a change in volume).³ Accordingly, Appellants'

³ According to Boyle's Law, pressure (P) and volume (V) are inversely proportional (i.e., $PV=k$). According to Charles' Law, volume (V) and

claimed gas spring encounters both an increase in pressure and volume due to an increase in temperature.

Similarly, Kenchington's valves control pressure within the device in response to changes in pressure caused by volume changes. Boyle's Law indicates that pressure and volume are inversely proportional. Accordingly, Kenchington's valves, which Appellants argue control pressure and volume in the chambers, serve the same purpose as Appellants' claimed valves that control the gas in the gas spring according to Boyle's Law. Therefore, even under the stricter analogous art test indicated in *Oetiker*, Kenchington is reasonably pertinent to the problem Appellants are trying to solve.

Appellants argue lack of motivation for the combination of Kenchington's valves with Simpkins' fuel cell assembly, and that Kenchington teaches away from the proposed combination. However, as noted above, we find that there is motivation for the combination: to prevent overpressurization of the gas spring. Kenchington discloses the motivation in that the valves release or admit gas when a preset pressure limit is reached.

Moreover, we do not agree with Appellants that Kenchington's use of the valves in a cyclically operated fluid displacement machine teaches away from using the valves in Simpkins' gas spring of the fuel cell assembly. Rather, as noted above, we determine Kenchington would have suggested using the valves in Simpkins' gas spring to avoid overpressurization.

temperature (T) are directly proportional (i.e., $V/T=k$). Boyle's Law and Charles' Law together yield the Combined Gas Law that mathematically states $(PV)/T=k$. It follows that a change in temperature will produce a proportional change in volume and pressure.

Appellants argue that the Examiner's combination of valves from different Kenchington embodiments shows lack of motivation. We view the Examiner's rejection pointing to the different valves as showing the concept of providing valves for the ingress and egress of gas is known. In fact, contrary to Appellants' argument, Kenchington's compressor embodiment shows a combination of an inlet valve 106 (i.e., check valve) for the ingress of gas and a valve 116 (i.e., check valve) for the egress of gas. Accordingly, Kenchington clearly demonstrates the combination of a first valve and a second valve within a single embodiment. Appellants' arguments are without persuasive merit.

We add that the combination of Kenchington's valves with Simpkins' gas spring of the fuel cell assembly would have been obvious because it is nothing more than the predictable use of prior elements (i.e., check valves) according to their established functions (i.e., releasing or admitting gas when a particular pressure is reached). *KSR*, 127 S. Ct. at 1740.

For the above reasons, we sustain the Examiner's § 103 rejection of claims 11-29 over Simpkins in view of Kenchington.

DECISION

The Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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